INSTITUTE OF MATHEMATICS EDUCATION

Junior Maths Olympiad 2026 (Primary Level)

Std.: V and VI | Question paper | Date: 01.02.2026

Time: 2 Hours | Total Marks: 100

Q.1. Find X and Y if (i) $(2378)_9 = (X)_{12}$ and (ii) $(4AB9)_{12} = (Y)_{15}$ **(6 marks)**

[Note: Here A stands for 10 and B stands for 11]

[Hint: First convert the numbers in the given base into decimals and then convert the decimals into the required base.]

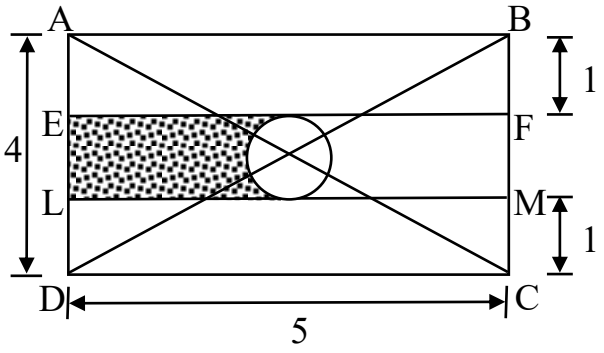
Q.2. Find the sum of 5-digit Harshad Numbers greater than 30,000 whose digital sum is 5. **(6 marks)**

[Note:(i) A Harshad number is a number which is divisible by the sum of its digits.
e.g. 12 is a Harshad Number but 14 is not a Harshad Number.
(ii) The Digital Sum of a given number means the sum of the digits of the given number e.g. Digital sum of 126 is 9]

Q.3. If n^{th} octagonal number is 176, then find
(i) value of n, and
(ii) the sum of first five terms of a sequence $T_n = O_n - P_n$,
where O_n is an octagonal number and P_n is a pentagonal number. **(6 marks)**

Q.4. GCD of 3 numbers is x and sum of the numbers is 41 times their GCD. If 17020 is divided by each of the numbers, then the remainder is 3. Also, if the difference between the largest number and the smallest number is 6 times the GCD, then find the middle number. **(6 marks)**

Q.5. Refer figure. ABCD is a rectangle. Point O is the point of intersection of the diagonals AC and BD, is the center of the circle. Lines EF and LM are parallel to AB. If the area of the dotted region is $\left(a - \frac{\pi}{b}\right)$, then a + b = ? **(6 marks)**



(Diagram not to scale)

Q.6. Each letter in the problem given below represents a distinct prime number, and the number written in front of the word indicates the product of the prime numbers correspponding to the letters of the word.

HAT $\rightarrow$ 30, MAN $\rightarrow$ 154, and NET $\rightarrow$ 715

Observe these carefully and then find the numbers represented by the words:
(i) HEAT, (ii) NEAT, (iii) MEET **(8 marks)**

Q.7. Let $(739)_{10} = (X)_5 = (Y)_7$ and $(2345)_{10} = (P)_7 = (Q)_5$. Then find values of P, Q, R, S, X, Y if $(X)_5 + (Q)_5 = (R)_8$ and $(P)_7 + (Y)_7 = (S)_6$ **(8 marks)**

Q.8. In the sixteen digits 1, 1, 1, 1, 2, 2, 2, 3, 3, 3, 4, 4, 4, 5, 5, 5. the digit 1 occurs four times and each of the other digits occurs three times. Fill in the sixteen digits in the square given here in such a way that in each cell there will be one digit, no digit will occur more than once in any row, column or diagonal and the digits in the first row will be in the positions shown in the square. Do not change the position of the numbers already filled. **(8 marks)**

2	1	3	4

Q. 9. Let (i) $\triangle a$ = a^2 , (ii) $\boxed{a}$ = 2a, and, (iii) $\textcircled{a}$ = 3a,

Terms t_1, t_2, t_3 are formed as given below. Observe the pattern.

First term : t_1 Second term : t_2 Third term : t_3

$\triangle 1 + \boxed{2} + \textcircled{3}$ $\triangle 2 + \boxed{3} + \textcircled{4}$ $\triangle 3 + \boxed{4} + \textcircled{5}$

Then (i) find the sum of the first 5 terms , (ii) find the 10^{th} term. **(8 marks)**

Q.10. Find 5 possible numbers whose total number of divisors are 96 and prime divisors are less than 17.

Express your answer in the form: $(2)^a \times (3)^b \times (5)^c \times \ldots\ldots$ **(8 marks)**

[Note: Multiple numbers are possible. List any 5 such numbers.]

Q.11. Consider natural numbers m and n. When their product is divided by 7, we denote the remainder as k. Now we define m * n = k.

[e.g. let m = 95, n = 6. Then 95 × 6 = 570 and 570 = (81 × 7) + 3 $\Rightarrow$ 95 * 6 = 3]

If 2026 * k = 1, then find 3 possible values of k. **(10 marks)**

Q.12. When A and B are the 2 stations on the rail track, we print 2 types of tickets (A$\rightarrow$B and B$\rightarrow$A). With addition of one more station C on rail track, we need to print 4 more types of tickets. (A$\rightarrow$C, C$\rightarrow$A, B$\rightarrow$C, C$\rightarrow$B). It is necessary that tickets must be printed connecting every station with the rest of the stations in both ways.

(i) Suppose there are 13 stations on a rail track. When few more stations are added, 54 new types of tickets are to be printed. Find the number of newly added stations.

(ii) Suppose there are some stations on a rail track. If few more stations are added, 44 new rail tickets are printed. Find number of stations already present on the rail track and find the number of newly added stations. **(10 marks)**

(Note: More than 1 solution is possible)

Q.13. ABCD is a rectangle. It is divided into 6 equal squares by drawing lines PQ, KR and LS.

(i) Prove that Δ LPC is an isosceles triangle.

(ii) Find measures of all angles of Δ LPC.

(Note: ∠ APL = 40° and ∠ PCD = 15° as shown in the diagram.) **(10 marks)**

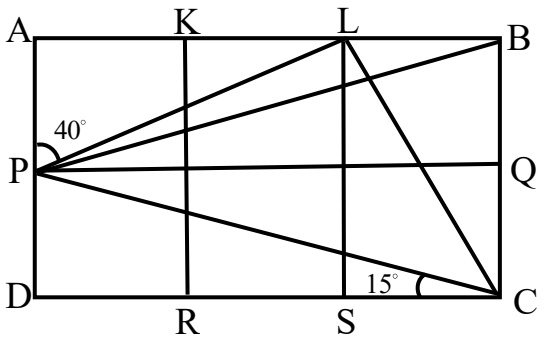


Diagram not to scale

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